Alberta Government

Resilience and Mitigation Framework for Alberta Floods

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Purpose of the Framework

The purpose of this framework is to outline the approach Alberta will use to plan, coordinate, assess and implement flood mitigation projects on a watershed basis (see Appendix A for Alberta's watersheds). The approach will reduce the risk of future flood events causing negative impacts on communities, the economy, and the environment. The approach will consider balancing water supply with water needs given the potential risk of drought. The approved mitigation projects will likely vary for each of the watersheds. Public and stakeholder consultation and cost/benefit analyses will be important components of projects that are brought forward.

Alberta's Flood Mitigation Strategic Plan

Flood mitigation is crucial to reduce the impacts of future flood damage. Mitigation includes short- and long-term projects that add layers of resiliency against future floods, reduces negative downstream impacts, and brings together projects at the regional and local levels.

The key elements guiding the mitigation approach include:

- Overall watershed management that looks at flood and drought and ensures upstream solutions don't have negative impacts in downstream communities or vice versa.
- The best technology for river modelling, prediction and warning systems.
- A review of all pertinent water management and development policies within risk areas.
- Working with municipalities, the private sector, the public and other stakeholders to gather and act on the best ideas we can to advance water management infrastructure in Alberta.
- Enhancing the government's current approach to erosion control.
- Supporting communities that are developing their own initiatives for flood mitigation.
- Supporting individual home owners, so they can better protect their homes from future floods.

See Appendix B for details on immediate, short, medium, and long term deliverables.

The Importance of Hazard, Risk and Vulnerability Assessment

It is often said that the best form of mitigation is to avoid the hazard in the first place. Effective mitigation uses a range of options to create and sustain resiliency across the province.

A thorough assessment of hazard and risk is critical so that decision-makers can take informed action to reduce vulnerability and increase community resilience. Flood vulnerability may be reduced by reducing the seriousness of the hazard (e.g., shave off peak flows) and reducing exposure (e.g., move people out of flood ways) so risks to people, property, infrastructure, and the environment are lessened. Arguably, the best approach to flood mitigation is to reduce exposure as reducing the hazard is difficult.

There are structural and non-structural approaches to resiliency and mitigation. Structural approaches include options such as berms, dikes and building standards. Non-structural includes policy direction, legislation, and natural services opportunities. The fundamental principle guiding resiliency and mitigation decisions is to work with the water, rather than against it. Healthy river systems are to be maintained and managed in such a way as to avoid and minimize manmade impacts to rivers so that the rivers can sustain themselves.

Where possible, Alberta will look at mitigation approaches that encourage future developments to be built outside of flood risk zones. However, where that is not possible, the Government of Alberta will look at a suite of mitigation options that minimize future risk of flooding and that create a more resilient environment in the event of a flood or drought occurring.

The Government of Alberta will continue to work with local authorities and experts to develop more accurate flood hazard and vulnerability maps, risk assessment tools, and awareness and outreach support to help make sound floodplain management decisions and take action to reduce the risk and vulnerability arising from floods.

Resilience and Mitigation Project Review

Working with government ministries, municipalities, and 3rd party experts as necessary, the Resilience and Mitigation team of the Flood Recovery Task Force will coordinate and compile a comprehensive list of water management mitigation projects, concepts and ideas. The team will undertake an initial screening to assess the proposed projects, concepts and ideas based on predetermined project screening criteria. The successful projects will then undergo a more in-depth feasibility assessment using third-party consultants as necessary. The Government of Alberta Mitigation Team will review the feasibility assessments and make a final recommendation of prioritized projects to the Assistant Deputy Minister (ADM) Flood Recovery Task Force for the projects that should be implemented. Projects endorsed at the ADM level will be submitted for a final funding decision to the Ministerial Task Force. Mitigation projects will be

subject to the requirements of provincial and federal legislation and may undergo additional assessment and public consultation steps. See Appendix C for flow chart.

Roles and Responsibilities

Resilience and Mitigation team

- To coordinate with the Government of Alberta Mitigation team to review and prioritize projects on a watershed basis using the Mitigation Selection Criteria Framework and recommendations from external consultants

Government of Alberta Mitigation team

- Recommend specific short-term mitigation projects to the ADM Task Force;
- Work with ministries in a collaborative manner to implement funded projects, ensuring that efficiency and effectively targeted resources continue to guide decisions about mitigation across the province and a long-term provincial approach to water management can occur; and
- Enhance external stakeholder and public education and awareness of mitigation and current efforts through public events and conferences.

Government of Alberta Ministries

- To provide communities and the public with hazard and risk information to increase public awareness of flood hazard and reduce vulnerability through planning and actions;
- To bring forward existing proposed mitigation projects;
- To assess proposed projects for alignment with provincial as well as departmental policies, planning and priorities; and
- Where appropriate, to project manage and implement approved projects or recommendations.

Local Authorities (municipalities, irrigation districts, Watershed Planning and Advisory Councils, non-government organizations)

- To bring forward existing proposed mitigation projects;
- To assess proposed projects against local government policies and priorities; and,
- Where appropriate, to project manage and implement approved projects or recommendations.

Guiding Principles for Project Selection

Projects must mitigate flood risk by enhancing public safety, ensuring environmental sustainability, and enhancing community resilience.

- Projects that support the flood mitigation strategic plan and support existing natural resource frameworks (e.g. Water for Life and the Land Use Framework) will be given the highest priority.
- Mitigation projects must demonstrate community benefits. Those projects with the broadest range of support will be considered priority.
- Projects should be designed for at least the 1% annual exceedance probability (100 year flood risk). Water infrastructure must follow safety guidelines.
- A social, environmental and economic cost/benefit analysis is required for each proposed project. Benefits must significantly outweigh the costs.
    - Projects showing other potential benefits, such as hydro-generation or irrigation, will be given a higher priority.
    - Projects must consider the implications for downstream users.
    - Projects should consider other natural disasters such as drought.

Project Evaluation Criteria Considerations

The following questions will be considered to evaluate mitigation project proposals.

Resilience and Mitigation Opportunity

- How much is the project expected to mitigate flood impacts during an event?
- Does the project consider drought implications, potentially by retaining water rather than moving it downstream more quickly?

Economic

- Is the mitigation concept cost effective and affordable?
- Will the expected benefits exceed the costs?

Social and Cultural

- Will the community benefit or incur costs from the implementation of the concept?
- What are the broader regional and community impacts, particularly downstream?

Environmental

- Will there be significant environmental impacts (upstream/downstream)?
- Can the negative impacts be mitigated?
- Is there an environmental benefit to the project?

Objectives

- Will the project achieve government and community objectives?
- Are we solving one problem and creating several others?
- Is the solution possible under the current regulatory framework?
- How does the project align with the flood mitigation strategic plan?
- Is the concept acceptable to the community or communities (upstream/downstream)?
- Is the concept consistent with longer-term planning and policy?
- Are there synergies between projects?
- How will the project enhance overall resilience?

Technical

- Is the concept technically feasible?
- Will the design be robust and reliable?
- What is the time frame for project implementation?
- Are future operational and maintenance costs sustainable?
- Will this solution have the ability to withstand and mitigate floods greater than a 1-in-100?
- Are other alternative options available or have they been considered?

Glossary of Definitions

Flood hazard area – The flood hazard area is typically divided into floodway and flood fringe zones and may also include areas of overland flow.

Floodway – The portion of the flood hazard area where flows are deepest, fastest and most destructive. The floodway typically includes the main channel of a stream and a portion of the adjacent overbank area. New development is discouraged in the floodway.

Flood fringe – The portion of the flood hazard area outside the floodway. Water in the flood fringe is generally shallower and flows more slowly than in the floodway. New development in the flood fringe may be permitted in some communities and should be flood proofed.

Flood hazard mapping – Flood hazard mapping marks out flood hazard areas along streams and lakes using design flood levels. Design flood levels are also known as one per cent flood events, or 1-in-100 year flood events.

Overland flow – Areas of overland flow are part of the flood hazard area outside of the floodway, and are typically considered special areas of the flood fringe.

Design flood – The current design standard in Alberta is the one per cent flood defined as a flood whose magnitude has a one per cent chance of being equaled or exceeded in any year. Although it can be referred to as a 100-year flood, this does not mean that it will only occur once every hundred years.

Design flood levels – Modelled water elevations within a flood hazard area based on design flood (one per cent flood event). Design flood levels do not change as a result of development or obstruction of flows within the flood fringe.

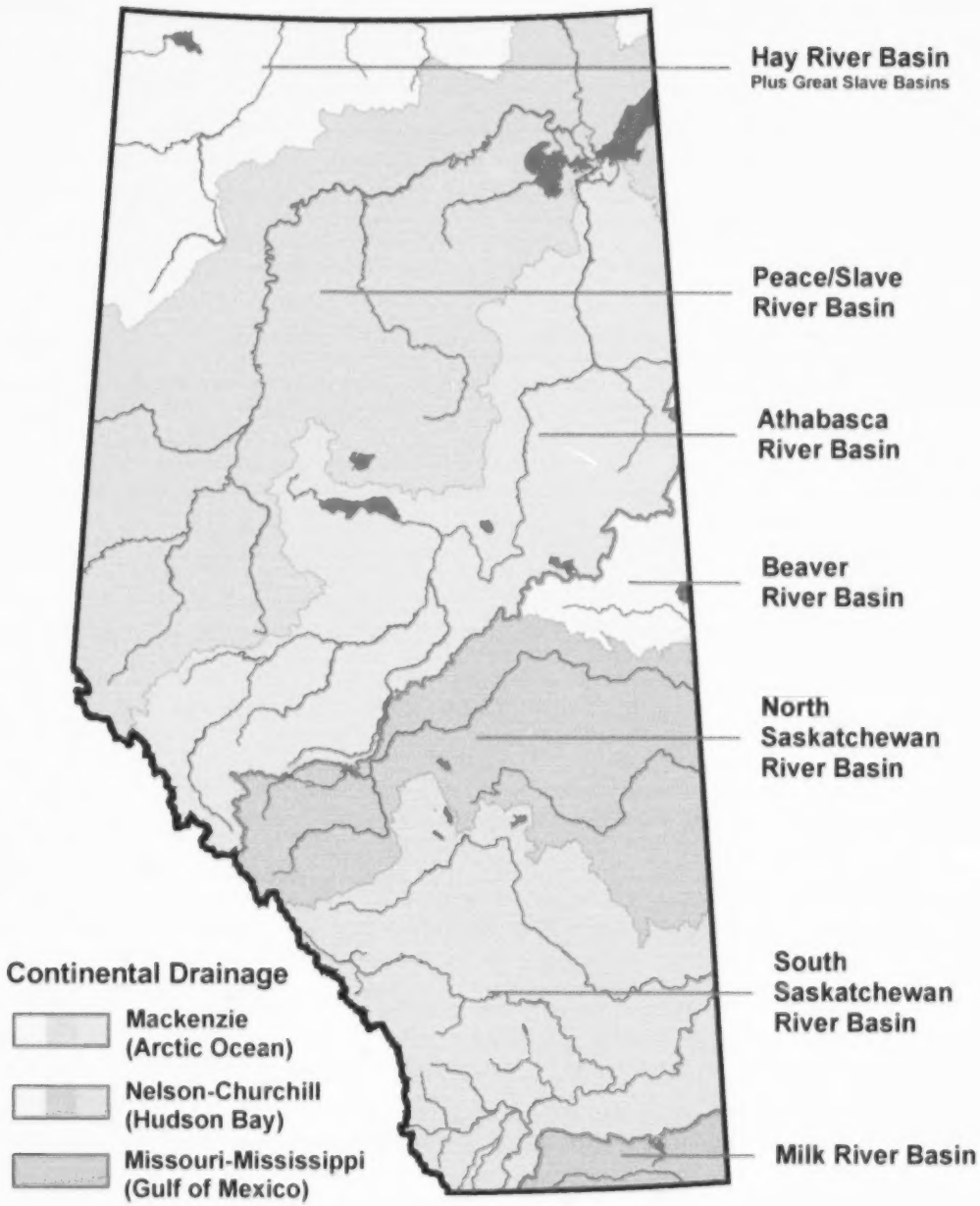
Mitigation – Implementing various measures and sustainable actions in order to reduce or lessen the long-term risk to people and property from future natural disasters.

Recovery – The return to a normal, pre-disaster state.

Resilience – The capacity of a system to cope with, adapt to or recover from a recurrent disturbance such as a flood. Resiliency includes planning for the future to reduce the need for mitigation.

Please visit the flood hazard mapping section of our website for diagrams and more information on these terms.

Appendix A: Alberta's Watersheds



Appendix B: The Alberta Flood Mitigation Strategic Plan

The Alberta Flood Mitigation Strategic Plan

System of Systems
1. Hydrology - basins, watersheds, streams
2. Water management and planning agencies
3. Land management and planning agencies

7 Elements of Mitigation
1. Overall Watershed Management
2. Modeling, Prediction, and Warning
3. Policies
4. Water Management Infrastructure
5. Erosion Control
6. Local Authorities
7. Individual Homes

Stakeholders
Albertans
First Nations
Local Authorities
WPACs
Non-Governmental Organizations
TransAlta
Industry
Irrigation Districts

Deliverables:

IMMEDIATE (Now–Spring 14)
1. Erosion Control Program implemented
2. Investigate Bow River operations
3. Municipal Implementation of Recovery Plans starts
4. Confirm long term feasibility and constructability of engineering projects
5. Expedite Engineering Review of Pilot EQ1
6. Funds for impact and efficacy evaluations of non-engineering projects are made available.

SHORT (Spring 14-Spring 15)
1. Initiate Highwood Diversion
2. Complete list of projects submitted by July 14
3. Review and gap analysis of existing infrastructure completed
4. Complete modeling, prediction based on the existing infrastructure and proposed projects.
5. Detailed design and development plan developed (December 2014)

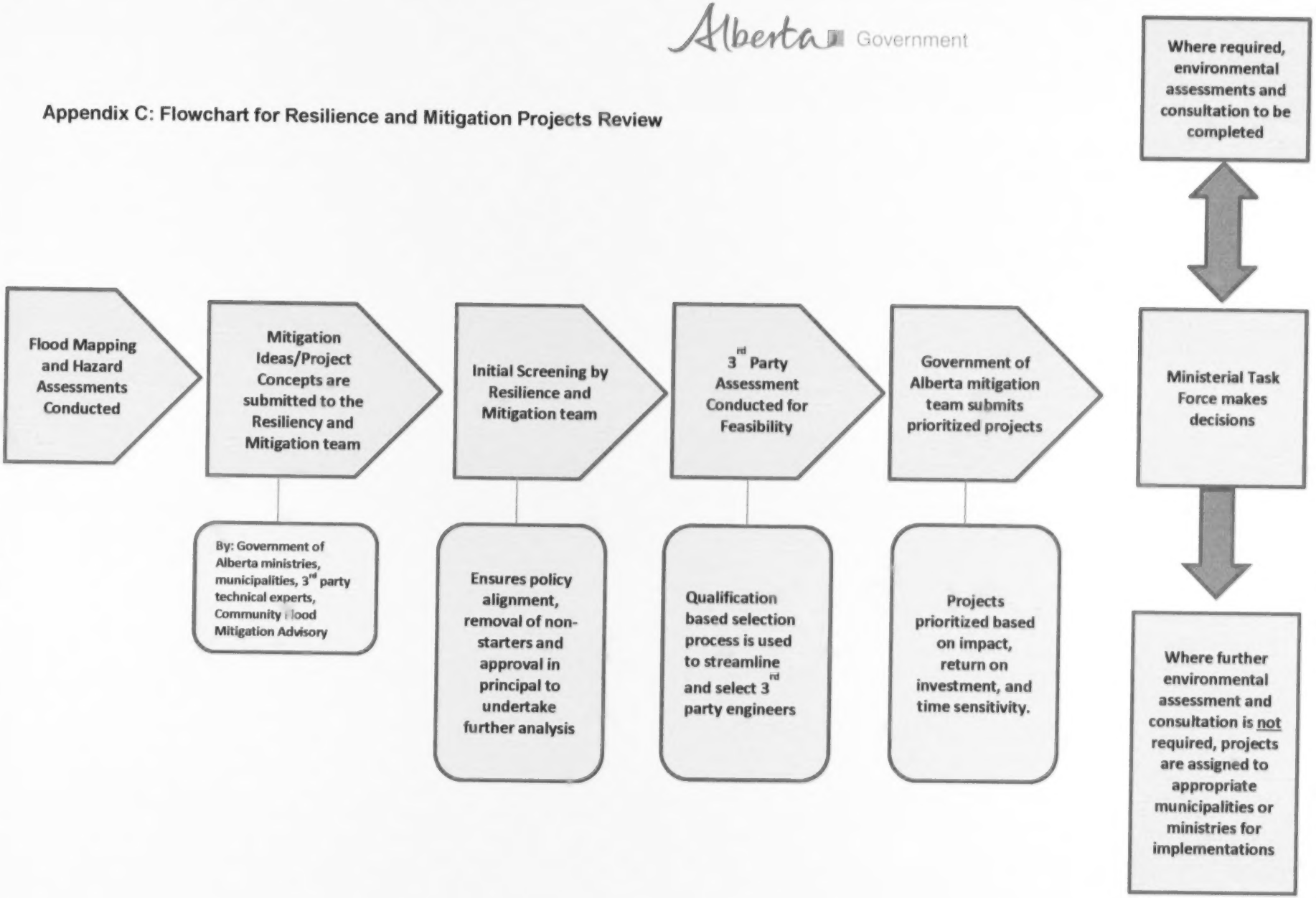
MEDIUM (Spring 15-Fall 16)
1. Construction of water management infrastructure begins
2. Full slopes to plains system identified
3. Complete waterway infrastructure requirements as identified
4. Natural watershed solutions and implementation plans developed
5. Legislative and policy solutions fully developed and implemented
6. Water and waste-water solutions implemented
7. Robust emergency management plans in place across Alberta municipalities
8. Area strategies complete and ready for final stage development

LONG (Fall 16-Spring 20)
1. Long-term engineering solutions begin to come on-line
2. Water management governance structure fully realized and in place
3. Land Use Framework and Mitigation and Resilience Framework are fully integrated
4. Final development of municipal mitigation and resilience plans completed.

As required: Environmental Impact Assessments and Regulatory Review

On-going: Regular Stakeholder Engagement throughout; Other priority capital and policy projects in Alberta continue

Appendix C: Flowchart for Resilience and Mitigation Projects Review


Flood Mapping and Hazard Assessments Conducted
Mitigation Ideas/Project Concepts are submitted to the Resiliency and Mitigation team
By: Government of Alberta ministries, municipalities, 3rd party technical experts, Community Flood Mitigation Advisory
Initial Screening by Resilience and Mitigation team
Ensures policy alignment, removal of non-starters and approval in principal to undertake further analysis
3rd Party Assessment Conducted for Feasibility
Qualification based selection process is used to streamline and select 3rd party engineers
Government of Alberta mitigation team submits prioritized projects
Projects prioritized based on impact, return on investment, and time sensitivity.
Ministerial Task Force makes decisions
Where required, environmental assessments and consultation to be completed
Where further environmental assessment and consultation is not required, projects are assigned to appropriate municipalities or ministries for implementations